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**DRAFT SITE INSPECTION PRIORITIZATION REPORT
FOR
COVITCH PROPERTY/ATF DAVIDSON CO. (FMR)
NORTHBRIDGE, MASSACHUSETTS**

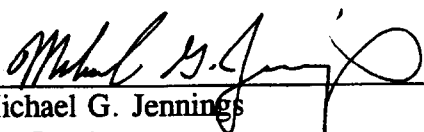
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30 October 1997

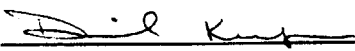
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10/30/97

Date

Work Order No. 11098-021-001-1162-50



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INTRODUCTION

The Roy F. Weston, Inc. (WESTON®) Superfund Technical Assessment and Response Team (START) was requested by the U.S. Environmental Protection Agency Region I (EPA Region I), Office of Site Remediation and Restoration to perform a Site Inspection Prioritization (SIP) of the Covitch Property/ATF Davidson Co. (FMR) property located on Main Street in Northbridge, Massachusetts. Tasks were conducted in accordance with the SIP scope of work and technical specifications provided by EPA Region I. An Site Inspection (SI) Report for the Covitch Property/ATF Davidson Co. (FMR) property was prepared by the Massachusetts Department of Environmental Protection (MA DEP) on 19 June 1991. The MA DEP SI concluded that there were two areas of groundwater contamination located on the property and that past on-site activities may have led to a release of several inorganic elements to the Mumford River. On the basis of the information provided in the SI report, the Covitch Property/ATF Davidson Co. (FMR) SIP was initiated.

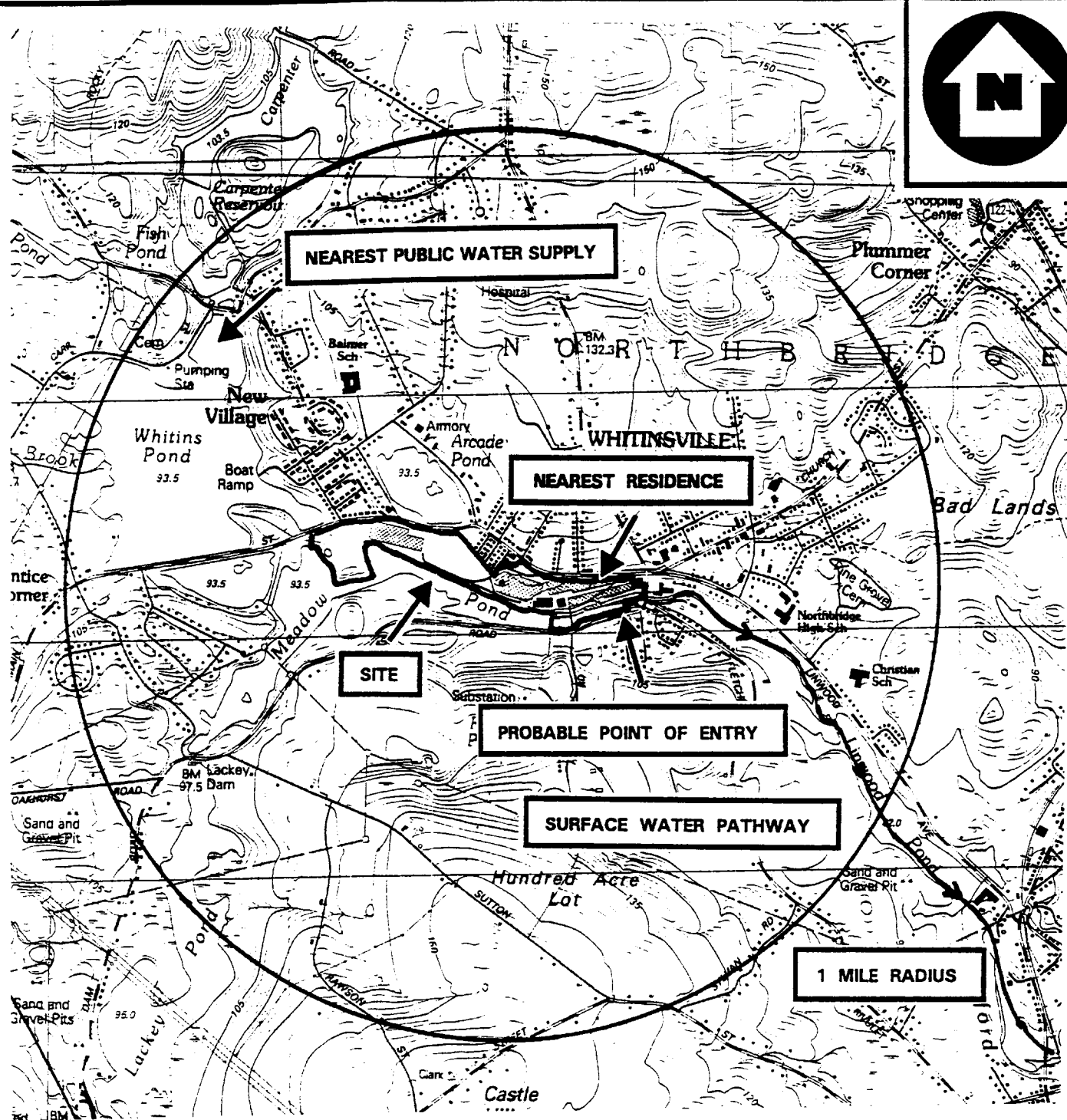
Background information used in the generation of this report was obtained through file searches conducted at EPA Region I, MA DEP, telephone interviews with town officials, conversations with persons knowledgeable of the Covitch Property/ATF Davidson Co. (FMR) property and conversations with other Federal, State, and local agencies.

This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA Region I regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State, or local regulations. SIPs are intended to provide a preliminary screening of sites to facilitate EPA Region I's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

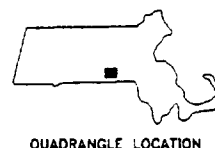
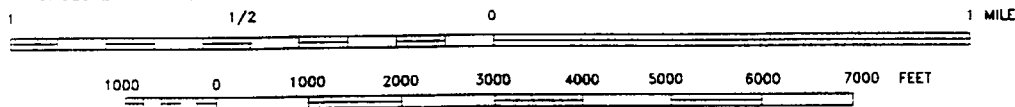
SITE DESCRIPTION

The Covitch Property/ATF Davidson Co. (FMR) property (the property) consists of approximately 65 acres of land on numerous parcels in Northbridge, Worcester County, Massachusetts at the following coordinates (measured from the center of the property): 42° 05' 34.5" north latitude and 71° 40' 34.0" west longitude (Figure 1). Parcels associated with the property are located on both the north and south side of the Mumford River, which bisects the property (Figure 2). The property is presently owned by the Whitinsville Redevelopment Trust (WRT) and the Arcade Realty Trust (ART). The property is currently operated as leased manufacturing and commercial warehouse space to approximately 30 companies [1; 2; 3; 25].

For this evaluation, the eastern developed portion of the property, on the north side of the Mumford River, will be referred to as the Covitch property (Figure 3). The remaining portion of the property on the north side of the Mumford River will be referred to as the Arcade property (Figure 4) [2; 3].



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15' U.S.G.S. QUADRANGLE(S):
WORCESTER SOUTH, MA 1983 AND UXBRIDGE, MA 1982



QUADRANGLE LOCATION

SITE LOCATION MAP
COVITCH PROPERTY
FORMER ATF DAVIDSON CO.
MAIN STREET
NORTHBRIDGE, MASSACHUSETTS

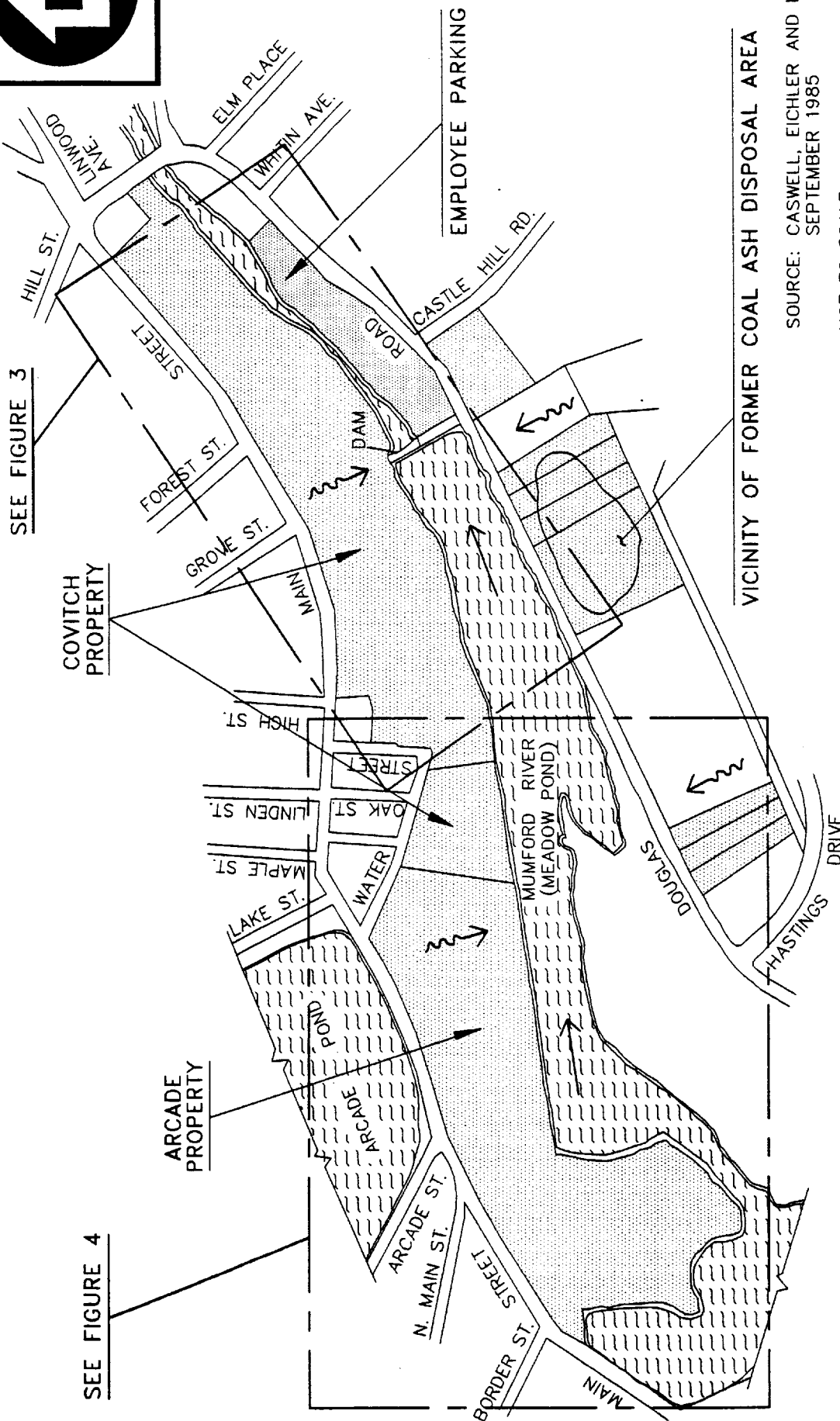
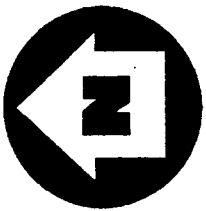


REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD #	DRAWN BY:	DATE
95-07-0065	M. JENNINGS	2/96

FILE NAME:
S:\95070065\FIG1

FIGURE 1



SOURCE: CASWELL, EICHLER AND HILL, INC.
SEPTEMBER 1985

NOT TO SCALE

WESTON[®]
MANAGERS
DESIGNERS/CONSULTANTS

REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

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FIGURE 2

SITE MAP

COVITCH PROPERTY/
FORMER ATF DAVIDSON CO.
MAIN STREET
NORTHBRIDGE MASSACHUSETTS

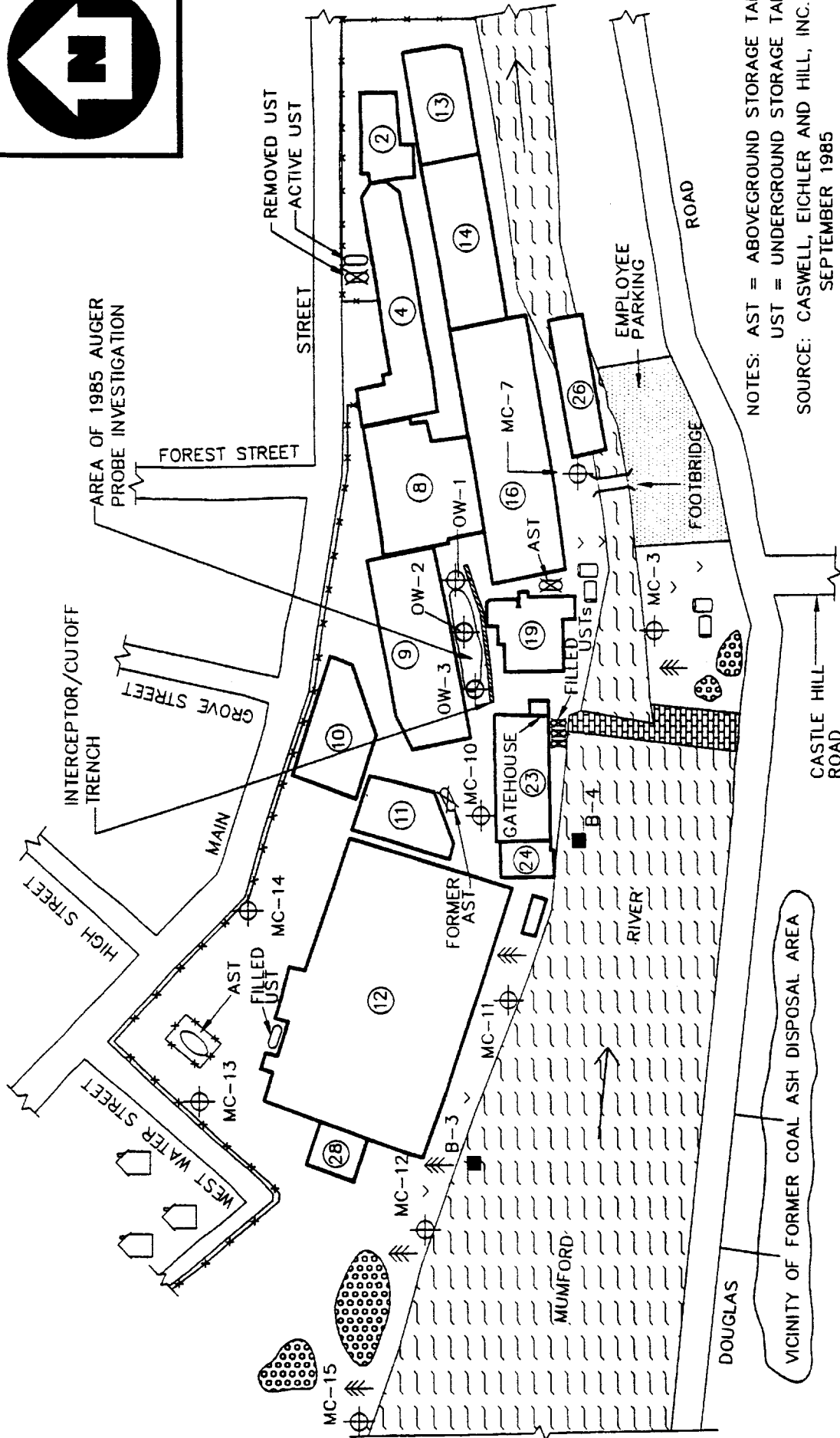
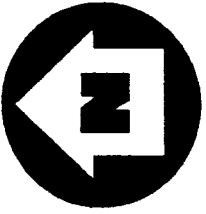
LEGEND

SURFACE WATER

SITE PROPERTY

GROUNDWATER FLOW DIRECTION

SURFACE WATER FLOW DIRECTION



NOTES: AST = ABOVEGROUND STORAGE TANK
 UST = UNDERGROUND STORAGE TANK
 SOURCE: CASWELL, EICHLER AND HILL, INC.
 SEPTEMBER 1985
 NOT TO SCALE

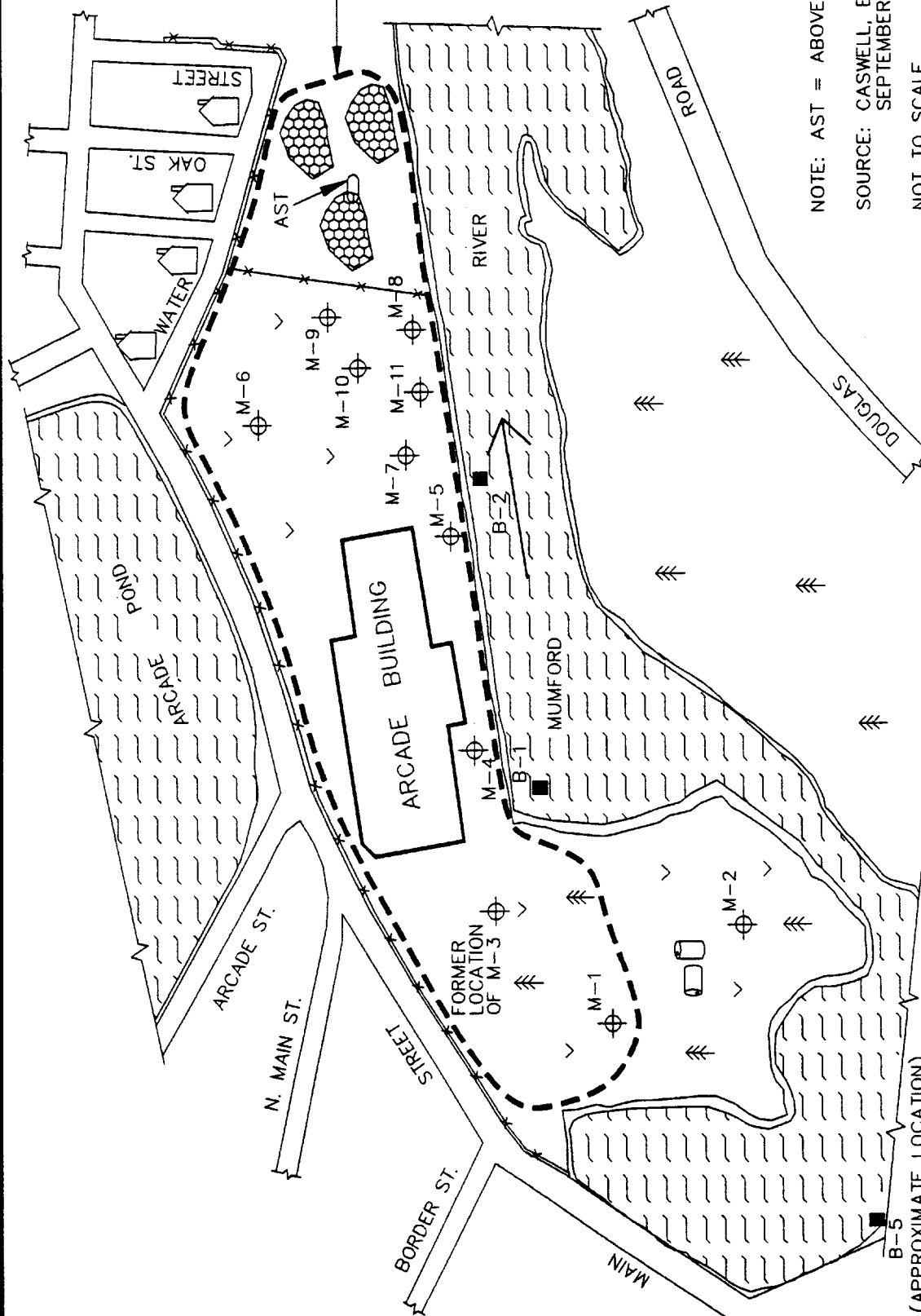
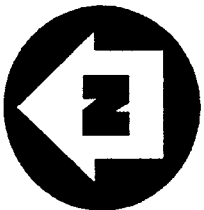
WESTON[®]
 MANAGERS
 REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
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TDD # 95-07-0065
 DRAWN BY: M. JENNINGS
 DATE: 7/96
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COVITCH PROPERTY SITE MAP
COVITCH PROPERTY /
ATF DAVIDSON CO. (FMR)
MAIN STREET
NORTHBRIDGE MASSACHUSETTS

LEGEND

→ FLOW DIRECTION	CEH SEDIMENT SAMPLE	55-GALLON DRUMS	FENCE	RESIDENCE
DEBRIS PILE	BUILDING NUMBER	MONITORING WELL (SCREENED IN OVERBURDEN)		
LARGE DAM				
PAVED PARKING				
SURFACE WATER				



NOTE: AST = ABOVEGROUND STORAGE TANK
SOURCE: CASWELL, EICHLER AND HILL, INC.
SEPTEMBER 1985
NOT TO SCALE



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FILE NAME:
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FIGURE 4

ARCADE PROPERTY SITE MAP

COVITCH PROPERTY/
FORMER ATF DAVIDSON CO.
MAIN STREET

NORTHBRIDGE MASSACHUSETTS

M-1	B-1	DRUMS	TREES	RESIDENCE	GRASS	FLOW DIRECTION
MONITORING WELL (SCREENED IN OVERBURDEN)						
DEBRIS PILE						
SURFACE WATER						
FENCE						

There are also two parcels of land on the south side of the Mumford River, a small partially paved employee parking lot and a former coal ash disposal area [2; 3]. For this evaluation, the employee parking lot will be considered as part of the Covitch property, while the former coal ash disposal area will be considered part of the Arcade property. The term *the property* refers to both the Covitch property and the Arcade property as a whole.

On 2 May 1996, START personnel conducted an on-site reconnaissance of the property. During the reconnaissance, START personnel attempted to locate the former coal ash disposal area. According to historical information, the former coal ash disposal area is located south of Douglas Road and west of Castle Hill Road. An area of landfilled material was observed in the general vicinity of the historical location of the former coal ash disposal area. The landfilled material consisted of a black uniform grained, non-native material with a surficial extent of approximately 7,500 square feet. However, START personnel were unable to locate monitoring wells MC-1 and MC-2 that were installed in 1985 in the former coal ash disposal area. Locating the two monitoring wells would have verified that the area in question was the former coal ash disposal area. START personnel also observed that the location of monitoring well M-3, located on the Arcade property had been paved, obliterating the well [3].

START personnel observed that the Mumford River flows through the property in an easterly direction. With the exception of the employee parking lot and the former coal ash disposal area, the Mumford River forms the southern boundary of the property. The property is perched approximately 5 feet above the river. A large dam on the Mumford River, which connects the main portion of the property to the employee parking lot was formerly used to power the on-site manufacturing operations and later to generate hydroelectricity [3].

The dam creates an impoundment reservoir which stretches to the western extent of the property and beyond. This portion of the Mumford River is commonly referred to as Meadow Pond. A man-made "Raceway" and a series of locks and gates, which were formerly utilized to divert water from the impoundment reservoir in order to directly power the manufacturing equipment, runs beneath the property and several of the on-site buildings. When the power generation system was in use, the diverted water would be returned to the Mumford River below the dam. The dam, Raceway, locks, and gates still exist on the property; although the locks and gates are currently closed isolating the Raceway from the Mumford River [1; 3].

START personnel observed several large pipes (plastic, metal, and reinforced concrete) protruding from the northern shoreline of the Mumford River, where the shoreline borders the property. The large pipes were noted above and below the water surface. Past occupants of the property are known to have discharged both treated and untreated industrial wastewater to the Mumford River. The present owners of the property were unable to provide any additional information concerning the discharge of industrial wastewater to the Mumford River. START personnel were unable to find any additional information concerning the discharge of treated or untreated wastewater to the Mumford River [3].

START personnel observed that there is a general lack of vegetation on the Covitch property due to extensive development, with the exception being a small strip of land bordering the northern bank of the Mumford River. Grass, shrubs, and some small trees are found in this area. The Arcade property which is located on a foundry sand landfill also contains a general lack of vegetation. The surficial soils of the foundry sand landfill tend to support sporadic grasses and some small trees and shrubs. A former island, which is now connected via landfilled material

to the northern shore of the Mumford River at the western extent of the Arcade property, shows thick vegetation, consisting of large trees and shrubs. This condition can be considered typical of the native vegetation of the area [3].

START personnel noted several piles of debris on both the Covitch property and Arcade property during the on-site reconnaissance. On the Covitch property several piles of concrete, brick, metal, and wood debris, associated with the ongoing renovation of the property were observed south of the Mumford River on the unpaved portion of the employee parking area. The total surficial extent of these piles was approximately 300 square feet [3].

On the Arcade property several piles of scrap metal were observed on the foundry sand landfill. These piles were also associated with the on-going renovation of the property. Several electric motors and an aboveground storage tank (AST) were strewn in among the debris. The tank volume appeared to be approximately 300 gallons. The total surficial extent of the debris piles was approximately 30,000 square feet. The surficial soils of the foundry sand landfill in the vicinity of the metal debris piles appeared stained with an oily-type material [3].

During the on-site reconnaissance, START personnel observed an additional AST in the northwest corner of the Covitch property. The volume of the AST appeared to be 275 gallons. The AST is used to store diesel fuel for vehicles utilized on the property. The AST was situated on a concrete pad. Access to the AST was restricted by a 6-foot high chain-link fence [3].

During the on-site reconnaissance, START personnel observed several 55-gallon drums in various conditions, throughout the property. Outside, six 55-gallon metal drums and one 55-gallon plastic drum were observed. Of these seven drums, one crushed and rusted metal drum was observed under a metal walkway in the vicinity of the former powerplant (Building No. 19), two empty and rusted metal drums were observed on the western extent of the property, and three empty metal and one empty plastic 55-gallon drums were observed on the unpaved portion of the employee parking lot located on the south side of the Mumford River [3].

Inside the mill complex, approximately 70 55-gallon drums were observed in the manufacturing areas of several of the current tenant companies. Labels on the drums indicated that the drums contained both virgin material and waste products associated with the various operations conducted on the premises by each business. Approximately 50 metal drums were observed with labels indicating that they contained "hazardous waste" or "waste oil." According to the representative of WRT, the material is hauled offsite by a licensed waste hauler [3].

Many of the companies leasing space within the property utilize flammable material in their manufacturing operations. Numerous explosion-proof flammable materials storage cabinets were observed in various buildings throughout the property. Additionally, several spray booths were observed operating in several of the manufacturing areas located throughout the on-site buildings. Several hazardous materials were observed in use during the on-site reconnaissance. These materials consisted of paints, thinners, solvents, inks, wood stains, adhesives, and cutting fluids/coolants [3].

START personnel also observed that an on-site residence is located within the mill complex on the Covitch property. Four people reside in this residence: an employee of WRT, his wife, and their two children. The residence is located in Building No. 4 [3].

OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

The exact chronology of ownership is difficult to determine; however, the following is known. The property was originally developed in the late-1800s as a foundry and metal fabrication mill by Whitin Machine Works (Whitin). *Whitin produced textile machines at the Covitch property from approximately 1837 to 1979. From 1941 to 1945, 85% of the facility was converted to war production. After the war, production of textile machines resumed. In 1979, the company converted to the production of graphic arts equipment. Major foundry processes at the Covitch property included metal casting, finishing, and heat treating. Foundry wastes were mixed with spent foundry sand and deposited adjacent to the present day Covitch property in an un-lined landfill called the "Arcade" from roughly 1930 to 1979.*

The Arcade property consists of foundry wastes which extend roughly 3,200 feet along the northern bank of the Mumford River. Total volume of the landfill is estimated at 40,000 cubic yards. The total surface area of the landfill is estimated to be 730,000 square feet. Landfill constituents include 90% spent foundry sand, 5% coal ash, and 5% paint, plating sludge, plating rinsewater, bromide salt baths, solvents, and cutting oils.

At some point, Whitin ceased on-site operations and White Consolidated Industries (WCI) commenced on-site operations. A second company, ATF Davidson, Co., a subsidiary of WCI, also operated on the property in the same time frame. WCI and ATF Davidson, Co. ceased operations on the property sometime in the late-1970s or early-1980s [2; 3].

Untreated electroplating wastewater was discharged from the Covitch property to the Mumford River from approximately 1930 to 1965. The practice was discontinued in 1965 when a wastewater treatment plant was installed. Treated wastewater was discharged to the Mumford River from 1965 until September 1982 when the treatment plant ceased operation. From approximately September 1974 until September 1982, the discharge of treated wastewater was conducted under a National Pollutant Discharge Elimination System (NPDES) permit No. MA 0001252. The present owners of the property were unable to provide any additional information concerning the discharge of industrial wastewater to the Mumford River. START personnel were unable to find any additional information concerning the discharge of treated or untreated wastewater to the Mumford River [3].

On 24 April 1985, an oil sheen was observed on the surface water in the Raceway by an unnamed party. The Massachusetts Department of Environmental Quality Engineering (MA DEQE) conducted an investigation of the oil release. On 30 April 1985, MA DEQE issued a Written Notice of Responsibility (WNOR) to ATF Davidson Co. The WNOR stated that "there is/has been a release/threat of release of oil/hazardous materials including waste oil and mercury at the former ATF Davidson Co. facility, Main Street, Northbridge, Massachusetts."

No further reference to mercury contamination could be found by START personnel. START personnel also could not find any analytical evidence indicating that mercury contamination was present at the property. Therefore, the mercury contamination reported in the 30 April 1985 WNOR will not be discussed further in this report. [4].

Note: Text which appears in italics indicates original portions of the Site Inspection report which were either copied or paraphrased.

WCI and ATF Davidson Co. retained Caswell, Eichler, and Hill, Inc. (CEH) to conduct an auger probe investigation of the oil release. As part of their investigation CEH collected several soil/source samples from two locations on the Covitch property. The soil/source samples were analyzed by Resource Analysts, Inc. (RAI) for volatile organic compounds (VOCs) via EPA Method 624, oil and grease, total phenols, barium, and priority pollutant metals. Five inorganic elements were detected above reference values at concentrations ranging from 1.5 to 560 parts per million (ppm). Oil and grease were also detected at concentrations up to 12,000 ppm. All samples were collected from depths of greater than 24 inches below grade [5]. Additional information concerning the auger probe investigation and the resulting soil/source sample collection is presented in the Waste/Source Sampling section of this report.

In a letter report dated 30 May 1985, CEH reported that an area between Building No. 9 and the Raceway the soil was saturated with oil, both above and below the water table. As a result of this report, MA DEQE requested that a hydrogeological investigation of the property be conducted. CEH conducted the investigation in two parts, with the Covitch property and Arcade property investigated separately [5].

The Covitch property hydrogeological investigation, which included the proposed installation of 15 groundwater monitoring wells, was completed first. Of the 15 proposed wells, five were unable to be completed, primarily due to drill refusal above the water table. The 10 overburden groundwater monitoring wells which were completed are referred to by the "MC" designation on Figure 3 and throughout this report. As previously mentioned, two of the monitoring wells (MC-1 and MC-2) were installed on the former coal ash disposal area. Due to the fact that the exact location of MC-1 and MC-2 could not be determined by START personnel, these wells are not located on Figure 3 [5].

Groundwater samples were collected from the 10 completed wells by CEH on 30 July 1985. The samples were analyzed by RAI for VOCs (EPA Method 624), priority pollutant metals, barium, and total cyanide. Two well samples (MC-7 and MC-14) were also analyzed for oil and grease, and phenols. CEH reported the results of the groundwater analyses in a September 1985 report. The September 1985 report indicated that no problem levels of VOCs, priority pollutant metals, cyanide, barium, or phenol were detected. However, CEH further stated that monitoring well MC-14 contained 24 milligrams per liter (mg/L) of oil and grease. This well is located northwest and upgradient of the Raceway [5].

CEH detailed the findings of the Covitch property investigation in the September 1985 report. In the report CEH addressed possible sources of oil contamination near the Raceway. According to CEH there have been documented oil releases on both the north and south side of the Raceway. The northern release, occurring over a period of years, was a result of the temporary outdoor storage of oil-soaked metal turnings in the vicinity of Building No. 9 prior to their off-site disposal. The southern release occurred in the basement of the powerhouse, Building No. 19. CEH stated in the report that a source on the powerhouse side of the Raceway was strongly suspected of causing the oil and grease contamination. No further information regarding the oil releases was given in the CEH report [5].

CEH collected sediment samples from the Mumford River on 18 July 1985 and 13 November 1985. The July 1985 sediment samples were analyzed for priority pollutant metals and barium. The November 1985 sediment samples were analyzed for chromium via EPA Method 3050 and were also subjected to an Extraction Procedure for Toxicity (EP Toxicity) test for chromium. All of the sediment analyses were conducted by RAI. Six metals, including chromium, were present in one or more of the sediment samples. Details regarding the results of the sediment analyses are discussed in the Surface Water Pathway section of this report [7; 8].

On 9 December 1985, New England Pollution Control Corporation, Inc. (NEPCCO) was contracted by WCI to install a cut-off trench/well system with a double pump recovery unit in order to remediate the groundwater contamination problem in the vicinity of Building No. 9, the Raceway, and the Mumford River. The system was installed between 23 December 1985 and 20 June 1986. Three observation wells (OW-1 through OW-3) were also installed in the vicinity of the cut-off trench/well system in order to monitor the effectiveness of the treatment system [6].

The only analytical data that START personnel were able to obtain relative to the observation wells indicated that samples were collected on 17 February 1987 and analyzed for VOCs by EPA Methods 601 and 602. Seven VOCs were detected above reference values at concentrations ranging from 3 to 57 parts per billion (ppb). The information START obtained does not indicate who collected the samples or who analyzed the samples. However since the sampling information was contained in a NEPCCO project report, START personnel assume that the groundwater samples were collected by NEPCCO personnel [6]. Additional information concerning the remediation system and the observation wells is presented in the Groundwater Pathway section of this report [6].

The NEPCCO project report indicated that the recovery system was operational from 13 June 1986 until approximately 11 February 1987. The recovery and treatment system was shut down in the spring of 1987 at the request of NEPCCO due to decreased levels of VOCs detected in the influent groundwater samples collected from the recovery system [6].

NEPCCO theorized that no petroleum was recovered during the operation of the recovery system because most of the oil contamination detected during the CEH auger probe investigation was removed during the excavation for the installation of the cut-off trench. START personnel estimate that approximately 15,000 cubic feet of soil was removed during the installation of the remediation system. The removed soil was sent to an asphalt batch plant for treatment. START personnel were unable to locate any additional information concerning the treatment system [2; 6].

The Arcade property hydrogeological investigation was conducted during summer 1985. Groundwater samples were collected by CEH from eight monitoring wells (M-1 through M-8) installed for the Arcade property investigation. These samples were analyzed by RAI for VOCs (EPA Method 624), priority pollutant metals, barium, and total cyanide. CEH detailed the findings of the investigation in a report entitled *Monitoring Well Installation and Ground Water and River Bottom Sediment Quality Analyses, ATF Davidson Company Arcade Facility* (October 1985 CEH report) [7].

The October 1985 CEH report indicated that the groundwater below the Arcade property contained detectable levels of four VOCs. Vinyl chloride, trans-1,2-dichloroethene, trichloroethene, and tetrachloroethene were detected in one or more of the groundwater samples at concentrations greater than the reference concentrations. Detected concentrations ranged from 10 ppb to 950 ppb. Barium was also detected in several groundwater samples at concentrations three times greater than reference values. Detected barium concentrations ranged to 2,900 ppb. Additional information concerning the summer 1985 groundwater sampling event is presented in the Groundwater Pathway section of this report [7].

As a result of the detection of VOCs in the groundwater below the Arcade property, an additional round of groundwater samples were collected by CEH on 13 November 1985 and sent to RAI for VOC analysis by EPA Method 624. The groundwater samples were also analyzed by RAI for arsenic, barium, and zinc. CEH detailed the results of the analysis conducted on the November 1985 groundwater samples in a report entitled *Additional Investigations ATF/Davidson Arcade Facility, Covitch Properties, Mumford River* (January 1986 CEH report). The January 1986 CEH report indicated that some of the VOCs previously detected in several of the monitoring wells were not detected in the 13 November 1985 samples collected from the same wells. However, the January 1986 CEH report further indicated that the concentrations of vinyl chloride and trans-1,2-dichloroethene detected in monitoring well M-8 were increasing. Barium and zinc were also detected at concentrations exceeding reference values. The results of the November 1985 groundwater sampling event are presented in the Groundwater Pathway section of this report [8].

A third round of groundwater samples was collected by CEH from the Arcade property on 24 January 1987, as part of an additional investigation of the area around monitoring well M-8. This investigation included the installation and sampling of three additional overburden groundwater monitoring wells (M-9 through M-11). The new wells are located radially in the vicinity of monitoring well M-8. The groundwater samples collected on 24 January 1987 were submitted to RAI for VOC analysis by EPA Method 624. Results of the analysis of the 24 January 1987 groundwater samples were documented in a CEH report entitled *Additional M-8 Investigations, ATF Davidson Arcade Facility* (March 1987 CEH report) [9].

The March 1987 CEH report stated that only one of the newly installed wells (M-9) contained VOC contamination. Tetrachloroethene was detected in this monitoring well at a concentration of 48 ppb. This compound had previously only been detected in monitoring well M-6 [9]. Additional details regarding the results of the sampling program are presented in the Groundwater Pathway section of this report.

Five soil/source samples were collected by CEH from the Arcade property in December 1986, during the installation of monitoring wells M-9, M-10, and M-11. All of the soil/source samples were analyzed by RAI for VOCs by EPA Method 8240. CEH detailed the results of the VOC analysis in the March 1987 report. Two VOCs (toluene and tetrachloroethene) were present in one or more of the soil/source samples at concentrations greater than reference values. Additional information concerning the December 1986 soil/source sampling event can be found in the Waste/Source Sampling section of this report [9].

In July 1987, CEH submitted a risk assessment report entitled *Risk Assessment of Area Surrounding M-8 at the ATF/Davidson Arcade Facility* (July 1987 CEH report). The July 1987

CEH report stated that the VOC-contaminated plume in the vicinity of monitoring well M-8 covered approximately 13,100 square feet. In the July 1987 CEH report, CEH theorized that the plume consisted predominantly of a parent compound (trichloroethene) and two "weathered" species (vinyl chloride and trans-1,2-dichloroethene). The report further stated that the mass balance of chemical compounds present in monitoring well M-8 shifted towards the "weathered" species. CEH attributed this to a long period of emplacement or an accelerated weathering process. According to the July 1987 CEH report, the chemicals detected in the Arcade property groundwater samples were migrating towards the Mumford River where the contamination would ultimately be diluted, diminishing its impact on human health and the environment [10].

In June 1991, MA DEP completed an SI on the property for EPA. No environmental samples were collected [2].

On 2 May 1996 START personnel conducted an on-site reconnaissance of the property. No environmental samples were collected [3].

According to START on-site observations and information START personnel received from WRT in September 1996, at least six underground storage tanks (USTs) and four ASTs exist and/or existed on the property. The information was compiled by Kroll Environmental Enterprises, Inc. (Kroll) on behalf of WRT. Some of the tanks have been removed, some have been filled in place, and some are still in use. A summary of the information concerning the ASTs and USTs is presented in Table 1 [11]. Approximate locations of the tanks are shown on Figures 3 and 4.

Table 1

**Summary of Underground and Aboveground Storage Tanks on the
Covitch Property/ATF Davidson Co. (FMR)**

Location	Size (gallons)	Contents	Status
Underground Storage Tanks			
Adjacent to Bldg. 4	500	Fuel Oil	Removed 1985
Adjacent to Bldg. 23	1,000	No. 6 Fuel Oil	Filled 1987
Adjacent to Bldg. 23	1,000	No. 6 Fuel Oil	Filled 1987
Adjacent to Bldg. 23	1,000	No. 6 Fuel Oil	Filled 1987
Adjacent to Bldg. 12	20,000	Fuel Oil	Filled 1984
Adjacent to Bldg. 4	5,000	Fuel Oil	Active
Aboveground Storage Tanks			
Adjacent to Bldg. 16	30,000	No. 6 Fuel Oil	Removed 1995
North of Bldg. 12	275	Diesel Fuel	Active
Adjacent to Bldg. 11	5,000	No. 6 Fuel Oil	Removed 1984
Debris pile on Arcade property	300	Unknown	Unknown

Bldg = Building
[11]

The information START personnel received from WRT, via Kroll, after the on-site reconnaissance also indicated that at least eight transformers which contained polychlorinated biphenyls (PCBs) were formerly located on the property. These transformers were verified by Transformer Service, Inc. (TSI) to contain PCBs. A TSI inspection on 15 April 1989, indicated that a transformer located adjacent to Building No. 19 appeared to have leaked. No further information concerning transformer leakage was available to START personnel. According to a representative of WRT, all of the PCB-containing transformers have been removed from the property. A summary of the transformers formerly located on the property and their date of removal from the property is presented in Table 2 [11].

Table 2

**Summary of Transformers Formerly Located on the
Covitch Property/ATF Davidson Co. (FMR)**

Location	Capacity (gallons)	Date Removed from Property
Bldg. 9, Floor 2	380	17 December 1993
Bldg. 9, Floor 3	380	6 June 1996
Bldg. 10	445	27 October 1994
Bldg. 12, Floor 1	300	28 June 1995
Bldg. 12, Floor 2	Unknown	Unknown
Bldg. 16	445	6 June 1996
Between Bldg. 16 and Bldg. 4	Unknown	6 June 1996
Bldg. 19	840	27 October 1994

Bldg. = Building
[11]

On 5 June 1997, START personnel received additional background information concerning the property from the MA DEP-Central Regional Office (MA DEP-CRO). The information was submitted to the MA DEP-CRO in March 1997 as part of two separate Tier Classification, Licensed Site Professional Opinion, and Numerical Ranking Scoresheets packages which had been prepared for the property by two different environmental consultants. CEH-Jacques Whitford (CEH-JW) prepared a package for the Covitch property and Kroll Environmental Enterprises, Inc. prepared a package for the Arcade property. The additional background information that START received from the MA DEP-CRO indicated that additional sampling had taken place since the START on-site reconnaissance of 2 May 1996, in order to better characterize the property for the Tier Classification [25].

The additional sampling, conducted by CEH-JW on 20 December 1996, included the collection of three source samples for PCB analysis and two soil/source samples for priority pollutant metals analysis. All samples were collected from the Covitch property. The source samples

collected for PCB analysis indicated that there is an area of PCB contamination inside of Building No. 10 which is located on the Covitch property. The soil/source samples collected for metals analysis confirm that the foundry sand landfill contains elevated levels of several metals. The source and soil/source sampling is discussed in greater detail in the Waste/Source Sampling section of this report [24].

Table 3 presents identified structures or areas on the Covitch Property/ATF Davidson Co. (FMR) property that are documented or potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

Table 3
Source Evaluation for
Covitch Property/ATF Davidson Co. (FMR)

Source Area	Containment Factors	Spatial Location
Foundry Sand Landfill	None	Arcade Property
VOC Plume	None	Arcade Property
Oil/VOC Plume	None	Covitch Property
Former Coal Ash Disposal Area	None	South of Douglas Road
55-gallon Drums	None	Exterior-Throughout Property
55-gallon Drums	None	Interior-Covitch Property
Debris Piles	None	Arcade Property
Debris Piles	None	Covitch Property
ASTs and USTs	None	Throughout Property
Industrial Wastewater Discharge	None	Along northern shore of Mumford River
Transformers	None	Covitch Property
PCB Release	None	Covitch Property (Building No. 10)

VOC = Volatile Organic Compound
 AST = Aboveground Storage Tank
 UST = Underground Storage Tank
 PCB = Polychlorinated Biphenyls
 No. = Number
 [2; 3; 5; 6; 7; 11; 25]

Table 4 summarizes the types of potentially hazardous substances which have been disposed, used, or stored on the Covitch Property/ATF Davidson Co. (FMR) property.

Table 4

**Hazardous Waste Quantity for
Covitch Property/ATF Davidson Co. (FMR)**

Substance	Quantity or Volume/Area	Years of Use/Storage	Years of Disposal	Source Area
Foundry Waste (A)	730,000 ft ² (40,000 yd ³)	NA	1930 to 1979	Foundry Sand Landfill
Coal Ash	Unknown	NA	1930 to 1979	Former Coal Ash Disposal Area
Waste Oil and/or Hazardous Waste	Approximately 3,000 gallons	Unknown to present	Unknown	55-gallon Drums/Interior Covitch Property
Various VOCs (B)	Unknown	Unknown	Unknown	VOC Plumes
Various Metals	30,000 ft ²	Unknown to present	Unknown	Debris Piles/ Arcade Property
Untreated Industrial Wastewater	Unknown	NA	1930-1965	Industrial Wastewater Discharge
Treated Industrial Wastewater	Unknown	NA	1965-1982	Industrial Wastewater Discharge
PCBs	3,000 gallons	Unknown to 1996	Unknown	Transformers

(A) Paint, plating sludge, plating rinsewater, bromide salt baths, solvents, and cutting oils.

(B) Benzene, 1,1-dichloroethane, trans-1,2-dichloroethene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, xylenes.

NA = Not applicable.

ft² = square feet.

yd³ = cubic yards.

VOC = Volatile Organic Compound.

PCBs = Polychlorinated Biphenyls.

[2; 3; 5; 6; 7; 11; 25]

The information START personnel received from WRT in September 1996, compiled by Kroll Environmental Enterprises, Inc., also indicated that at least seven RCRA notifiers currently operate on the property. Nine additional RCRA notifiers are located within 1-radial mile of the property. There are no Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) properties located within 1-radial mile of the property. Table 5 presents a summary of the RCRA generators operating on the property at the time of this report [11; 12; 13].

Table 5

**Information Provided by Kroll Environmental Enterprises, Inc. Concerning
RCRA Generators Located on the Covitch Property/ATF Davidson Co. (FMR)**

Company	RCRIS No.	Generator Status
Allen-Bailey Tag & Label Inc.	MAV000017848	Very Small Quantity
Comtran Corporation	MAD981201833	Small Quantity
Greene Systems, Inc.	MV5082344541	Very Small Quantity
Swissturn/USA, Inc.	MAV000010324	Small Quantity
The Green Point Co., Inc.	MV5084761992	Very Small Quantity
Tomkins Corp.	MAD985271188	Small Quantity
Washington Mills Electro Minerals Corp.	MAV00000333960546	Very Small Quantity

RCRIS = Resource Conservation and Recovery Information System
[11]

WASTE/SOURCE SAMPLING

Soil/source samples were collected from the Covitch property during the auger probe investigation conducted by CEH in May 1985. CEH chose five sampling locations for the auger probe investigation. These locations were determined based on their proximity to the Raceway. Three of the locations (AP-101, AP-102, and AP-103) met refusal prior to reaching the desired depths and were abandoned. The other two locations (AP-104 and AP-105) were advanced to the desired depth and numerous soil/source samples were collected in 2-foot increments from each location between the depths of 8 and 17 feet below grade. None of the soil/source samples were collected from depths of 24 inches or less. These samples were analyzed by RAI for oil and grease, total phenols, barium, and priority pollutant metals. Three of the samples, AP-104 (S-4), AP-105 (S-1), and AP-105 (S-3), were also analyzed for VOCs by EPA Method 624 [5].

START personnel chose soil/source sample AP-105/S-3 as the reference sample due to its minimal contamination. No VOCs were detected in any of the soil/source samples which received the VOC analysis. The soil/source samples indicated that there was a layer of oil and grease present on the property, with the highest concentration present in sample AP-104/S-2 at 12,000 ppm. This sample was collected approximately 11 feet below grade. Arsenic, barium, beryllium, nickel, and zinc were detected at concentrations greater than reference concentrations in soil/source sample AP-104/S-5. Maximum concentrations for these elements ranged from 1.5 ppm for beryllium to 560 ppm for barium. Soil/source sample AP-104/S-5 was collected from approximately 16 feet below grade [5].

Five soil/source samples were collected by CEH from the Arcade property in December 1986, during the installation of monitoring wells M-9, M-10, and M-11. CEH collected two soil/source samples during the installation of monitoring well M-10. One sample was from above the water table and one sample was from below the water table. CEH collected two soil/source samples during the installation of monitoring well M-11. Again, one sample was from above the water table and one sample was from below the water table. CEH also collected one soil/source sample from above the water table during the installation of monitoring well M-9. All of the soil/source samples were analyzed by RAI for VOCs by EPA Method 8240. CEH detailed the results of the VOC analysis in the March 1987 report. The March 1987 report does not indicate the depth at which groundwater was found during the December 1986 sampling event. Because groundwater depths on the Arcade property have been reported to range between 3 to 7 feet below grade, START personnel assume for this report that all of the December 1996 soil/source samples were collected from depths greater than 24 inches below grade [7; 8; 9].

START personnel chose soil/source sample B-11, collected from below the water table during the installation of monitoring well M-11, as the reference sample due to its uncontaminated condition. Two VOCs (toluene and tetrachloroethene) were present in one or more of the soil/source samples at concentrations greater than reference values. Toluene was present in all of the soil/source samples at concentrations ranging from 0.6 to 4.8 ppm. Tetrachloroethene was present at 1.2 ppm in the soil/source sample collected during the installation of monitoring well M-9. This sample was collected from above the water table [9].

Table 6 presents a summary of the maximum concentrations for substances detected in the soil/source samples collected by CEH from the Covitch property in May 1985 and the Arcade property in December 1986. A substance is listed if it was detected at a concentration three times or greater than the reference sample concentration. However, if the compound or element was not detected in the reference sample then the substance is listed if it was detected at a concentration equal to or greater than the reference sample detection limit (DL).

Table 6

**Summary of Maximum Concentrations
Analytical Results for Soil/Source Samples collected by
Caswell, Eichler, & Hill, Inc. for the Covitch Property/
ATF Davidson Co. (FMR)**

Contaminant	Maximum Sample Concentration (ppm)	Sample ID	Reference Concentration (ppm)	Reference ID
Arsenic	71	AP-104/S-5	8.9	AP-105/S-3
Barium	560	AP-104/S-5	83	AP-105/S-3
Beryllium	1.5	AP-104/S-5	0.19	AP-105/S-3
Nickel	19	AP-104/S-5	3	AP-105/S-3

Table 6

**Summary of Maximum Concentrations
Analytical Results for Soil/Source Samples collected by
Caswell, Eichler, & Hill, Inc. for the Covitch Property/
ATF Davidson Co. (FMR)
(Concluded)**

Contaminant	Maximum Sample Concentration (ppm)	Sample ID	Reference Concentration (ppm)	Reference ID
Zinc	230	AP-104/S-5	56	AP-105/S-3
Tetrachloroethene	1.2	B-9 (AWT)	DL (0.5)	B-11 (BWT)
Toluene	4.8	B-10 (BWT)	0.6	B-11 (BWT)
Oil and Grease	12,000	AP-104/S-2	DL (15)	AP-105/S-3

ppm = Parts per million
DL = Detection limit
AWT = Above water table
BWT = Below water table
[5; 9]

On 20 December 1996, CEH-JW collected three source samples for PCB analysis from areas of obvious staining associated with transformers which had formerly been located on the Covitch property. TRANS-3, a six-point composite sample, was collected adjacent to a former transformer pad located along the southern edge of Building No. 12. TRANS-110, a grab sample of residual oily absorbent material, was collected from the footprint of a transformer which was formerly located inside Building No. 10. TRANS-217, a grab sample of oily dirt, was collected from within a contained area on the first floor roof of Building No. 10. Transformers were present at the location of sample TRANS-217 at the time of the START on-site reconnaissance and at the time of the CEH-JW sampling event. Since START received information from WRT, via Kroll, indicating that all PCB-containing transformers were removed from the property, START personnel assume that the transformers present on the roof of Building No. 10 do not contain PCBs [25].

The samples collected in conjunction with the transformer locations were submitted to Eastern Analytical, Inc. for EPA Method 8080 PCB analysis. The PCB analysis was conducted between 24 December 1996 and 31 December 1996. Aroclor-1260 was detected in sample TRANS-110 at a concentration of 400 ppm. No other PCB compounds were detected in any of the source samples [25].

Two shallow (0 to 2 feet below grade) soil/source samples (ASH-1 and ASH-2) were collected by CEH-JW on 20 December 1996 from the eastern extent of the foundry sand landfill located adjacent to the Covitch Property. The exact locations of the two soil/source samples were not depicted in the information received from the MA DEP-CRO [25].

The foundry sand landfill samples were submitted to Eastern Analytical, Inc. for EPA Method 8270 polynuclear aromatic hydrocarbon (PAH) analysis and priority pollutant metals analysis. The PAH analysis was conducted on 31 December 1996. No PAH compounds were detected in the shallow soil/source samples. The priority pollutant metals analysis was conducted on 2 January 1997. Chromium, copper, and lead were detected in sample ASH-2 at concentrations three times greater than the concentrations detected in sample ASH-1 (reference sample). START personnel chose sample ASH -1 as the reference sample due to its uncontaminated condition. Detected concentrations ranged from 88 to 1,000 ppm [25].

Table 7 presents a summary of the maximum concentrations for substances detected in the samples collected by CEH-JW from the Covitch Property on 20 December 1996. A substance is listed if it was detected at a concentration three times or greater than the reference sample concentration. However, if the compound or element was not detected in the reference sample then the substance is listed if it was detected at a concentration equal to or greater than the reference sample detection limit (DL).

Table 7

**Summary of Maximum Concentrations
Analytical Results for Soil/Source Samples collected by
CEH-Jacques Whitford, Inc. for the Covitch Property/
ATF Davidson Co. (FMR)**

Contaminant	Maximum Sample Concentration (ppm)	Sample ID	Reference Concentration (ppm)	Reference ID
Chromium	1,000	ASH-2	8.3	ASH-1
Copper	120	ASH-2	28	ASH-1
Lead	88	ASH-2	8	ASH-1
PCBs (Aroclor-1260)	400	TRANS-110	NA	NA

ppm = Parts per million
PCBs = Polychlorinated biphenyls
NA = Not applicable
[25]

GROUNDWATER PATHWAY

The Covitch property is almost entirely developed with a large industrial mill complex which dates back to the 1800s. Due to this, overburden encountered on this portion of the property is considered borrow fill. CEH described this material in the 1985 monitoring well installation report for the Covitch property investigation as consisting of brown (grayish below the water table) silty fine to medium sand with occasional coarse gravel, cobbles, and small boulders. CEH further reported that this material closely resembled the native till of the region. Groundwater depths on the Covitch property ranged from 5 to 8 feet below grade. CEH determined that groundwater in this area generally flows south towards the Mumford River.

CEH calculated that the groundwater seepage velocity below the Covitch property varied from a minimum of approximately 3.5 feet per year (eastern extent) to a maximum of approximately 52 feet per year (western extent) [5].

Two of the monitoring wells installed as part of the 1985 Covitch property investigation were located in the former coal ash disposal area south of Douglas Road. CEH reported that the overburden encountered during the installation of these monitoring wells was similar to that encountered on the Covitch property. Groundwater was encountered on the former coal ash disposal area property approximately 5 feet below grade. CEH estimated that groundwater below the former coal ash disposal area was flowing north towards the Mumford River. CEH calculated that the groundwater seepage velocity below the former coal ash disposal area was approximately 3.5 feet per year [5].

To the west of the mill buildings on the Covitch property the overburden is comprised of foundry fill. CEH described the foundry fill in the 1985 monitoring well installation report for the Arcade property investigation as consisting of fine to coarse sand and gravel with some pumice like material, foundry bed glass, and ash. The fill material is a result of the large foundry which operated on the Covitch property. The spent foundry sand was graded into the river creating a large land mass which stretches approximately 3,200 feet west of the former foundry building (Building No. 12). The filled area contains approximately 40,000 cubic yards of material in an area approximately 730,000 square feet. CEH reported that groundwater was encountered on the Arcade property at depths varying between 3 and 7 feet below grade. CEH determined that groundwater below this portion of the property was flowing south towards the Mumford River. CEH calculated that the groundwater seepage velocity below the Arcade property was approximately 23 feet per year [2; 7].

During the hydrogeological investigation of the Covitch property five of the monitoring well locations met refusal above the water table, preventing the installation of these wells. As a result, only 10 monitoring wells were completed. CEH theorized that refusal was a result of a bedrock surface or a boulder layer above the bedrock. According to CEH this theory was reinforced by the presence of a dam and large smoke stack adjacent to the attempted monitoring well locations, both of which require a shallow bedrock foundation [5].

One of the monitoring wells that CEH installed on the Arcade property was required by MA DEQE to be advanced until refusal was encountered. CEH chose monitoring well M-1 located on the former island for this purpose. Split-spoon and auger refusal was encountered 18 feet below grade. CEH theorized that this corresponded to the bedrock surface in this area. According to CEH this decision was supported by a visible bedrock outcrop approximately 200 feet south of the area of interest [7].

No bedrock formations mapped within a 4-mile radius of the property exhibit karst characteristics [14].

The mean annual rate of precipitation for Northbridge, Massachusetts is 45.59 inches [15].

There are approximately 19,466 people relying upon municipal drinking water wells located within 4-radial miles of the property. These wells are located in the towns of Douglas, Grafton, Northbridge, Sutton, and Uxbridge. The nearest municipal well is the Whitinsville Station located in Northbridge, Massachusetts. This well is located approximately 0.9 miles northwest of the property. The well is operated by the Whitinsville Water Company and serves approximately 2,814 people in the Town of Northbridge [16; 18].

The population served by each municipal well was estimated by multiplying the average number of persons per household in each household by the approximate number of year-round water department accounts in each respective town. The average number of persons per household was obtained from 1990 U.S. Census data, and the approximate number of year-round water department accounts were obtained in telephone conversations with the respective town water departments [17].

Private groundwater supplies within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying population, households, and private water wells for "Block Groups" which lie within or partially within individual radial distance rings of the property. According to the CENTRACTS report there are approximately 4,879 people relying upon private groundwater wells for drinking water purposes within 4-radial miles of the property. The Northbridge Board of Health and the Whitinsville Water Company were unable to provide information regarding the exact location of the nearest private well. The CENTRACTS report indicates that there are 16 people utilizing private wells within 0.25-radial miles of the property [16].

Tables 8 and 9 summarize public and private groundwater usage within 4-radial miles of the property.

Table 8

**Public Groundwater Supply Sources Within 4-Radial Miles of the
Covitch Property/ATF Davidson Co. (FMR)**

Distance/Direction from Site	Source Name	Location of Source ^a	Estimated Population Served	Source Type ^b
0.9 miles Northwest	Whitinsville Station	Northbridge, MA	2,814	Unknown
1.9 miles Northwest	Sutton Station	Sutton, MA	6,056	Unknown
3.3 miles Southeast	S. Main Street Wells (3)	Uxbridge, MA	5,372*	Unknown
3.4 miles Southwest	West Street Well No. 2	Douglas, MA	1,162	Unknown
3.5 miles Southwest	West Street Well No. 1	Douglas, MA	1,338	Unknown
3.7 miles North	Providence Road Well	Grafton, MA	918	Unknown

Table 8

**Public Groundwater Supply Sources Within 4-Radial Miles of the
Covitch Property/ATF Davidson Co. (FMR)
(Concluded)**

Distance/Direction from Site	Source Name	Location of Source ^a	Estimated Population Served	Source Type ^b
3.8 miles South-Southwest	Putnam Hill Road Wells (3)	Sutton, MA	496*	Unknown
3.9 miles Southeast	Blackstone Street Wells (3)	Uxbridge, MA	1,310*	Unknown

^a Indicates Town in which well is located.

^b Overburden, Bedrock, or Unknown.

*: Combined total population served by the three wells.

[18]

Table 9

**Estimated Drinking Water Populations Served by Groundwater Sources
Within 4-Radial Miles of the Covitch Property/ATF Davidson Co. (FMR)**

Radial Distance From Covitch Property/ATF Davidson Co. (FMR) property	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
0.00 < 0.25	16	0	16
0.25 < 0.50	36	0	36
0.50 < 1.00	179	2,814	2,993
1.00 < 2.00	857	6,056	6,913
2.00 < 3.00	1,434	0	1,434
3.00 < 4.00	2,357	10,596	12,953
Totals	4,879	19,466	24,345

[16; 18]

On 24 April 1985, an oil sheen was observed by an unknown party on the surface water contained within the Raceway. As a result of this observation an investigation was initiated to determine the cause of the oil sheen. CEH completed an auger probe investigation in the area of concern in May 1985. This investigation indicated that a layer of oil and grease was present both above and below the water table in the vicinity of the Raceway.

As a result of the presence of the oil and grease layer the hydrogeological investigation of the Covitch property was initiated. Additional information concerning the auger probe investigation is presented in the Waste/Source Sampling section of this report [5].

As previously mentioned, the Covitch property investigation included the proposed installation of 15 groundwater monitoring wells, 10 of which were actually completed. CEH collected groundwater samples from these wells on 30 July 1985. The samples were analyzed by RAI for VOCs (EPA Method 624), priority pollutant metals, barium, and total cyanide. Two well samples (MC-7 and MC-14) were also analyzed for oil and grease, and phenols. The September 1985 CEH report for the investigation indicated that no problem levels of VOCs, priority pollutant metals, cyanide, barium, or phenol were detected in the groundwater samples. However, CEH further stated that monitoring well MC-14 contained 24 mg/L of oil and grease. This well is located northwest and upgradient of the Raceway [5].

According to the September 1985 CEH report, there have been documented oil releases on both sides of the Raceway, one in the basement of the powerhouse (Building No. 19) and one in an area between Building No. 9 and the Raceway where oil-soaked metal turnings were temporarily stored outdoors prior to off-site disposal. CEH stated in the report that the source on the powerhouse side of the Raceway was strongly suspected of causing the oil and grease contamination [5].

On 9 December 1985, NEPCCO was contracted by WCI to install a cut-off trench/well system with a double pump recovery unit, in order to remediate the groundwater contamination problem in the vicinity of Building No. 9, the Raceway, and the Mumford River. The system was installed between 23 December 1985 and 20 June 1986 [6].

Three overburden observation wells (OW-1 through OW-3) were also installed as part of the remediation system. The only analytical data that START personnel were able to locate relative to the collection of groundwater samples from the observation wells is contained within the Project Summary Report prepared by NEPCCO. A data table contained within the report indicated that groundwater samples were collected from the wells on 17 February 1987 and analyzed by an unknown laboratory for VOCs by EPA Methods 601 and 602. START personnel chose the groundwater sample collected from observation well OW-2 as the background location due to its minimal contamination. According to the data table, seven VOCs were detected in one or more of the observation wells at concentrations greater than reference values. The following compounds were detected above reference values benzene, 1,1-dichloroethane, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, and xylenes. Detected concentrations ranged from 3 to 57 ppb [6].

The NEPCCO project report indicated that the recovery system was operational from 13 June 1986 until approximately 11 February 1987. According to the 1991 EPA SI report, the recovery and treatment system was shut down in the spring of 1987 at the request of NEPCCO due to decreased levels of VOCs detected in the influent groundwater samples collected from the recovery system. START personnel were unable to locate any additional information concerning the treatment system [2; 6]

The hydrogeological investigation of the Arcade property was conducted by CEH during summer 1985. On 18 July 1985, CEH collected groundwater samples from the eight groundwater monitoring wells (M-1 through M-8) installed on the Arcade property. These samples were analyzed by RAI for VOCs (EPA Method 624), priority pollutant metals, barium, and total cyanide. START personnel chose the groundwater sample collected from monitoring well M-1 as the background location due to its crossgradient location and its uncontaminated condition. The October 1985 CEH report indicated that the groundwater below the Arcade property contained detectable levels of four VOCs. Vinyl chloride, trans-1,2-dichloroethene, trichloroethene, and tetrachloroethene were detected in one or more of the monitoring well samples at concentrations greater than reference values. Detected concentrations ranged from 10 ppb for trichloroethene (M-3) to 950 ppb for tetrachloroethene (M-6). Barium was also detected in several groundwater samples at concentrations three times greater than the barium concentration of the reference sample (M-1). Barium was present at the highest concentration (2,900 ppb) in the sample from monitoring well M-5 [7].

As a result of the detection of VOCs in the groundwater below the Arcade property, an additional round of groundwater samples were collected by CEH on 13 November 1985 and sent to RAI for VOC analysis by EPA Method 624. The groundwater samples were also analyzed by RAI for arsenic, barium, and zinc. The January 1986 CEH report indicated that some of the VOCs previously detected in several of the monitoring wells were not detected in the 13 November 1985 samples collected from the same wells. However, the January 1986 CEH report further indicated that the concentrations of vinyl chloride and trans-1,2-dichloroethene detected in monitoring well M-8 were increasing. The concentrations detected in the 13 November 1985 groundwater samples collected from monitoring well M-8 ranged from 380 ppb for vinyl chloride to 1,100 ppb for trans-1,2-dichloroethene. START personnel chose the groundwater sample collected from monitoring well M-1 as the background location due to its crossgradient location and its uncontaminated condition. No VOCs were detected in the background sample (M-1) collected with the November 1985 groundwater samples. Barium and zinc were also detected at concentrations three times greater than reference sample (M-1) concentrations. Barium was present at the highest concentration (3,100 ppb) in the monitoring well M-5 sample. Zinc was also present at the highest concentration (11 ppb) in the M-5 sample [8].

A third round of groundwater samples were collected by CEH from the Arcade property on 24 January 1987, as part of an additional investigation of the area around monitoring well M-8. This investigation included the installation and sampling of three additional monitoring wells (M-9 through M-11). The new wells are located radially in the vicinity of monitoring well M-8. The groundwater samples collected on 24 January 1987 were submitted to RAI for VOC analysis by EPA Method 624 [9].

The March 1987 CEH report stated that only one of the newly installed wells (M-9) contained VOC contamination. Tetrachloroethene was detected in monitoring well M-9 at a concentration greater than the reference value. START personnel chose the groundwater sample collected from monitoring well M-10 as the reference location due to its uncontaminated condition. Tetrachloroethene was detected in M-9 at a concentration of 48 ppb. This compound had previously only been detected in monitoring well M-6 [9].

The March 1987 report also stated that the concentrations of vinyl chloride (280 ppb) and trans-1,2-dichloroethene (640 ppb) detected in monitoring well M-8 were decreasing. In addition, trichloroethene was detected at 17 ppb in the March 1987 monitoring well M-8 groundwater sample [9].

In July 1987, CEH submitted a risk assessment report concerning the area around monitoring well M-8. This report stated that the VOC-contaminated plume covered approximately 13,100 square feet. CEH also theorized in the report that the plume consisted predominantly of a parent compound (trichloroethene) and two "weathered" species (vinyl chloride and trans-1,2-dichloroethene). The report further stated that the mass balance of chemical compounds present in monitoring well M-8 had shifted towards the "weathered" species. CEH attributed this to a long period of emplacement or an accelerated weathering process. The CEH report further stated that the chemicals were migrating towards the Mumford River where the contamination would ultimately be diluted, diminishing its impact on human health and the environment [10].

Table 10 presents a summary of the maximum concentrations for substances detected in groundwater samples collected by CEH from the Covitch Property/ATF Davidson Co. (FMR) property. A substance is listed if it was detected at a concentration three times or greater than the reference sample concentration. However, if the compound or element was not detected in the reference sample then the substance is listed if it was detected at a concentration equal to or greater than the reference sample detection limit (DL).

Table 10
Summary of Maximum Concentrations
Analytical Results for Groundwater Samples collected at the
Covitch Property/ATF Davidson Co. (FMR)

Date	Contaminant	Maximum Concentration (ppb)	Sample Location	Reference Concentration (ppb)	Background Location
11/85	Vinyl Chloride	380	M-8	DL (10)	M-1
7/85	Tetrachloroethene	950	M-6	DL (5)	M-1
11/85	Trans-1,2-dichloroethene	1,100	M-8	DL (5)	M-1
7/85	Trichloroethene	30	M-6	DL (5)	M-1
2/87	1,1-Dichloroethane	17	OW-1	5	OW-2
2/87	1,1,1-Trichloroethane	12	OW-1	2	OW-2
2/87	Benzene	12	OW-1	DL (1)	OW-2
2/87	Toluene	57	OW-1	DL (1)	OW-2
2/87	Xylenes (Total)	40	OW-1	DL (1)	OW-2
11/85	Zinc	11	M-5	<10	M-1

Table 10

**Summary of Maximum Concentrations
Analytical Results for Groundwater Samples collected at the
Covitch Property/ATF Davidson Co. (FMR)
(Concluded)**

Date	Contaminant	Maximum Concentration (ppb)	Sample Location	Reference Concentration (ppb)	Background Location
11/85	Barium	3,100*	M-5	< 10	M-1
7/85	Oil and Grease	24,000	MC-14	None	None

ppb = Parts per billion
DL = Detection Limit

Notes: 1985 groundwater samples were collected by Caswell, Eichler, & Hill, Inc.
1987 groundwater samples were collected by New England Pollution Control Corporation.
* Value exceeds the Maximum Contaminant Level (MCL) of 2,000 ppb.

[6; 7; 8]

SURFACE WATER PATHWAY

The property is primarily located along the northern shore of the Mumford River, bordering the river for approximately 1.1 miles. There is also a land parcel located along the southern shore of the river which is associated with the property. The land parcel bordering the southern shore of the Mumford River contains a paved employee parking area (eastern extent) and an unpaved area used to store piles of renovation debris (western extent). The dam, owned by WRT, is located between the Covitch property on the northern shore and the employee parking lot on the southern shore. The impoundment reservoir created by this dam is referred to as Meadow Pond. The property is located within portions of both the 100-year and 500-year floodplain [3; 19].

The length of the Mumford River frontage passing through the property contains numerous Probable Point of Entry (PPE) areas. There are various discharge pipes, and drainage swales located along the northern shore of the Mumford River. Due to the large number of storm drains and discharge pipes observed during the on-site reconnaissance, START personnel assume that surface water runoff from the developed portion of the property drains directly to the Mumford River. For this evaluation, the most-upstream PPE area is the western extent of the filled area containing spent foundry sand and other materials located on the Arcade property [3].

The downstream pathway includes flow along the Mumford River for approximately 4.5 miles until its convergence with the Blackstone River and flow for approximately 10.5 miles along the Blackstone River, until the 15-mile terminus is reached in Woonsocket, Rhode Island. The Mumford River flows through several ponds including Meadow Pond, Linwood Pond, Whittin Pond, Caprons Pond, and several unnamed ponds prior to converging with the Blackstone River. The mean annual flowrate of the Mumford River is approximately 45 cubic feet per second (cfs).

and the mean annual flowrate of the Blackstone River is 433 cfs. The mean annual flow rate for the Mumford River was based on historical information from the former East Douglas gaging station formerly located approximately 3 miles upstream of the property. The Blackstone River mean annual flow rate was determined from the partial record station located in Northbridge, Massachusetts [1; 10; 21].

Table 11 contains a summary of waterbodies found along the 15-mile downstream pathway for the Covitch Property/ATF Davidson Co. (FMR) property.

Table 11
Water Bodies Along the 15-Mile Downstream Pathway for
Covitch Property/ATF Davidson Co. (FMR)

Surface Water Body	Descriptor ^a	Length of Reach (miles)	Flow Characteristics (cfs) ^b	Length of Wetlands (miles)
Mumford River ^c (Meadow Pond)	Small to moderate stream	4.5	45	2.86
Blackstone River ^d	Moderate to large stream	10.5	433	5.44

^a Minimal stream < 10 cfs. Small to moderate stream 10-100 cfs. Moderate to large stream > 100-1,000 cfs. Large stream to river > 1,000-10,000 cfs. Large river > 10,000-100,000 cfs. Very large river > 100,000 cfs. Coastal tidal waters (flow not applicable). Shallow ocean zone or Great Lake (flow not applicable). Moderate depth ocean zone or Great Lake (flow not applicable). Deep ocean zone or Great Lake (flow not applicable). Three-mile mixing zone in quiet flowing river 10 cfs or greater.

^b Cubic feet per second.

^c Includes Meadow Pond, Linwood Pond, Whitin Pond, Caprons Pond, and several unnamed ponds.

^d Includes Rice City Pond.

[1; 10; 20; 21]

There are no known municipal drinking water intakes located along the downstream pathway. However, a surface water intake, used for irrigation of commercial food crops at the Sherman-Baker Farm, is located along the Mumford River in North Uxbridge, Massachusetts. The surface water intake is located along the downstream pathway approximately 2 miles downstream of the large dam on the Covitch property [22].

There are no sensitive environments located along the approximately 1.1 miles of Mumford River frontage which bisects the property. The nearest sensitive environment is an approximate 6-acre *Palustrine* forested wetland located approximately 0.8 miles downstream of the property. There are approximately 2.86 miles of wetland frontage along the Mumford River portion of the downstream pathway and approximately 5.44 miles of wetland frontage along the Blackstone River portion of the downstream pathway. There are two occurrences of Commonwealth of Massachusetts-listed species of concern along the Mumford River portion of the downstream pathway. Along the Blackstone River portion of the downstream pathway, there are two occurrences of Commonwealth of Massachusetts-listed threatened/endangered species and six occurrences of Commonwealth of Massachusetts-listed species of concern [20; 23].

Table 12 contains a summary of the sensitive environments found along the 15-mile downstream pathway for the Covitch Property/ATF Davidson Co. (FMR) property.

Table 12

**Sensitive Environments Along the 15-Mile Downstream Pathway for
Covitch Property/ATF Davidson Co. (FMR)**

Sensitive Environment Name	Sensitive Environment Type	Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs) ^a
CWA Waterbody	CWA Waterbody	Mumford River	<0.1	45
Wetlands	Wetlands	Mumford River	0.8 ^b	45
State-Concerned Species	State-Concerned Species	Mumford River	2.8 ^c	45
Wetlands	Wetlands	Blackstone River	4.5 ^d	433
State-Concerned Species	State-Concerned Species	Blackstone River	5.4 ^e	433
State-Endangered/ Threatened Species	State-Endangered Species	Blackstone River	10.8 ^f	433

^a Cubic feet per second

^b There are approximately 2.86 miles of wetlands frontage located along the Mumford River. The nearest is approximately 0.8 miles downstream of the PPE area.

^c There are two occurrences of Commonwealth of Massachusetts-Concerned Species located along the Mumford River. The nearest is approximately 2.8 miles downstream of the PPE area.

^d There are approximately 5.44 miles of wetlands frontage located along the Blackstone River. The nearest is approximately 4.5 miles downstream of the PPE area.

^e There are six occurrences of Commonwealth of Massachusetts-Concerned Species located along the Blackstone River. The nearest is approximately 5.4 miles downstream of the PPE area.

^f There are two occurrences of Commonwealth of Massachusetts-Endangered/Threatened Species located along the Blackstone River. The nearest is approximately 10.8 miles downstream of the PPE area.

CWA = Clean Water Act

PPE = Probable Point of Entry

[20; 23]

Visual evidence observed during the START on-site reconnaissance indicates that the Mumford River is a recreational fishery. The evidence consisted of a handwritten sign on the property pointing out a good fishing location and a number of fishing poles which were utilized by WRT personnel. Also, the representative of WRT indicated that employees of the businesses located on the property often fish from the northern shore of the Mumford River during their lunch periods. START personnel assume for this evaluation that the Blackstone River is a recreational fishery, as well [3].

The Covitch property has operated as a large industrial mill complex since the 1800s. Several of the manufacturing processes carried out within the mill complex have potentially impacted the Mumford River. A large foundry operated on the Covitch property through approximately the mid-1970s. Foundry wastes were mixed with spent foundry sand and disposed of by landfilling the material on the Arcade property and grading the material into the river. As a result of this disposal practice, a channel within the river was filled; connecting a small island to the northern shore of the river adjacent to the Arcade property. The 1991 EPA SI report for the property details the landfilled material as consisting of 90% spent foundry sand, 5% coal ash, and 5% paint, plating sludge, plating rinsewater, bromide salt baths, solvents and cutting oils. According to the 1985 CEH report, approximately 3,200 feet of river frontage on the property consisted of filled material. Additionally, the 1991 EPA SI report indicated that the filled area contained approximately 40,000 cubic yards of material in an area of approximately 730,000 square feet [2].

The 1991 EPA SI report for the property stated that untreated electroplating wastewater had been discharged to the Mumford River from the property between 1930 to 1965. According to the EPA SI report, an on-site wastewater treatment plant was installed on the property in 1965 and treated wastewater was discharged to the Mumford River from 1965 until September 1982. Between 1974 and 1982 discharge of treated wastewater was carried out under a NPDES permit (No. MA0001252). The 1991 EPA SI report indicated that the wastewater treatment plant ceased operations in September 1982. The SI report did not indicate why operations ceased. The present owners of the property were unable to provide any additional information concerning the discharge of industrial wastewater to the Mumford River. START personnel were unable to find any additional information concerning the discharge of treated or untreated wastewater to the Mumford River [2].

An additional area associated with the on-site mill complex, which has potentially impacted the Mumford River/Meadow Pond is the Raceway located on the Covitch property. The Raceway was used for on-site power generation for manufacturing operations during the 1800s. Water from the impoundment reservoir, created by the on-site dam, was diverted inland under several of the on-site buildings via the Raceway. This water was used to directly power manufacturing equipment. The water was then discharged back to the Mumford River below the dam. The Raceway was later used to generate electricity in an on-site power plant [2].

In April 1985, an oil sheen was observed by an unknown party on the surface of the water in the Raceway. This discovery led to the CEH hydrogeological investigation of the Covitch property. In the September 1985 CEH report it was determined that the sheen observed in the Raceway was the result of draining metal turnings outside between Building No. 9 and the Raceway [5]. Information concerning the source of the sheen can be found in the Waste/Source Sampling section of the report. Information concerning the hydrogeological investigation of the Covitch property can be found in the Groundwater Pathway section of this report.

In spring 1985, MA DEQE requested that a hydrogeological investigation be completed for the Arcade property. WCI retained CEH to collect five benthic core/sediment samples from the Mumford River/Meadow Pond. The sediment samples (B-1 through B-5) were collected from the Mumford River on 18 July 1985 by representatives of CEH. Sediment sample locations are depicted on Figures 3 and 4. These samples were analyzed for priority pollutant metals and barium by RAI between 23 July 1985 and 12 August 1985.

Results of the analyses indicated that there were high levels of six metals in the sediments of the Mumford River. Cadmium, chromium, copper, lead, nickel, and zinc were all detected in one or more of the sediment samples at concentrations greater than three times the reference concentration of the upstream reference sample (B-5). Cadmium, however, has never been detected above reference concentrations on the property and therefore will not be discussed further in this report. The concentrations of the metals which have historically been detected on the property ranged from 12 ppm for nickel to 920 ppm for zinc [7]. Table 13 presents a summary of the maximum concentrations of the metals detected in the sediment samples collected from the Mumford River on 18 July 1985. A metal is listed if it was detected at three times or greater than the upstream reference sample concentration.

Table 13

**Summary of Maximum Concentrations
Analytical Results for Sediment Samples collected by
Caswell, Eichler, & Hill, Inc. for the Covitch Property/ATF Davidson Co. (FMR)**

Contaminant	Maximum Sample Concentration (ppm)	Sample ID	Reference Concentration (ppm)	Reference ID
Chromium	410	B-1	65	B-5
Copper	110	B-1	10	B-5
Lead	350	B-4	14	B-5
Nickel	17	B-1	3.8	B-5
Zinc	920	B-3	150	B-5

ppm = Parts per million

[7]

Additional sediment samples were collected from the Mumford River on 13 November 1985 by representatives of CEH. Eleven sediment samples were collected and sent to RAI for analysis during this sampling round. The samples were analyzed for chromium via EPA Method 3050. The samples were also subjected to an EP Toxicity test for chromium. The sediment samples collected on 13 November 1985 are not depicted in Figures 3 and 4 because the majority of the samples were collected upstream of the property. However, it should be noted that the locations of sediment samples B-1 through B-5 collected on 13 November 1985 correspond to the locations of the sediment samples collected on 18 July 1985 [7; 8].

Results of the EPA Method 3050 analyses indicated that chromium concentrations ranged from 200 to 2,300 ppm. Start personnel chose the chromium concentration of sediment sample B-6 as the reference concentration because it was the most upstream sample collected. Chromium was detected at concentrations greater than three times the reference value in six of the 11 samples collected [8].

It should be noted that all of the sediment samples collected, to date, were located within the same basin of the Mumford River. The samples were collected from the impoundment reservoir, Meadow Pond, created by the on-site dam. CEH theorized in the October 1985 CEH report that the dam on the property created a settling basin, resulting in the elevated metals concentrations. The impoundment reservoir created is contained between the dam on the property and Lackey Dam located approximately 1.2 miles upstream of the western extent of the property. A true upstream reference sample would need to be located above Lackey Dam [1; 7].

CEH reported that the EP Toxicity results indicated that a retardation agent was affecting the mobility of the chromium present in the river bottom sediments. CEH based this on the fact that even though chromium was detected via EPA Method 3050 procedures, virtually none of the chromium was extractable [8].

SOIL EXPOSURE PATHWAY

The nearest residence is located within the mill complex on the Covitch property. Four people reside in this residence: an employee of WRT, his wife, and their two children. The residence is located in Building No. 4. Based on both historical records and past environmental reports these residents do not appear to be living on a source, or within 200 feet of a source. Approximately 1,200 people work for businesses located on the property. However, the only on-site employees which START personnel will consider targets for soil exposure for this report are the approximately eight people working for WRT on the landscape/grounds maintenance crew. Alternatives Unlimited Day Habitation Program is a school located in one of the on-site buildings. The school is used to train special need students. The students and faculty of the school are not likely targets for soil exposure due to the fact that activities are limited to within the on-site building and the building is not believed to be located on a source. There are no terrestrial sensitive environments located on the property [3].

The property is located in a mixed residential, commercial, and industrial section of Northbridge. Both vehicular and pedestrian access to the portion of the property on the north side of the Mumford River (Covitch and Arcade properties) is restricted. Three sides of the property are enclosed by a 6-foot high chain-link fence. There is also a combination of on-site employees and a 24-hour security service patrolling the property. However, pedestrian access to the property can be gained via the Mumford River. Additionally, there is unrestricted pedestrian and vehicular access to the former coal ash disposal area which is located along Douglas Road south of the Mumford River [3].

According to the CENTRACTS report, prepared by Frost Associates, Inc. for the property, there are approximately 5,327 people residing within 1-radial mile of the property. To date, no known soil samples have been collected on residential properties in the vicinity of the subject property. Based on available information and on-site observations, nearby residential properties are not likely targets from the soil exposure pathway [3; 16].

Two surficial soil/source samples (collected from less than 24 inches below grade) were collected from the eastern extent of the foundry sand landfill on the property by CEH-JW December 1997. Chromium, copper, and lead were detected at concentrations ranging from 88

to 1,000 ppm. Additional information concerning the December 1997 soil/source sampling event is presented in the Waste/Source Sampling section of this report [24].

AIR PATHWAY

To date no known air samples have been collected on the property. As previously mentioned, four people reside on the subject property; an employee of WRT, his wife, and their two children. There are approximately 1,200 people employed with and working for the businesses located on the property. According to the CENTRACTS report prepared by Frost Associates, Inc. for the property, an estimated 27,419 people live within 4-radial miles of the property. Table 14 summarizes the estimated population distribution within 4-radial miles of the property [2; 3; 16].

Table 14

**Estimated Population Within 4-Radial Miles of the
Covitch Property/ATF Davidson Co. (FMR)**

Radial Distance From Covitch Property/ATF Davidson Co. (FMR) (miles)	Estimated Population
0.00 < 0.25	1,328
0.25 < 0.50	1,350
0.50 < 1.00	2,649
1.00 < 2.00	5,320
2.00 < 3.00	8,140
3.00 < 4.00	8,632
TOTAL	27,419

[16]

There are no Federal-proposed, -threatened, or -endangered species within a 4-radial miles of the property. However, there is one occurrence of State-threatened/endangered species and seven occurrences of State-listed species of concern located within 4-radial miles of the property [23]. There are approximately 1,448 acres of wetlands within 4-radial miles of the property [20]. Table 15 summarizes the sensitive environments located within 4-radial miles of the property.

Table 15

**Sensitive Environments Located Within 4-Radial Miles of
Covitch Property/ATF Davidson Co. (FMR)**

Radial Distance from Covitch Property/ATF Davidson Co. (FMR) (miles)	Sensitive Environment/Species (status)
0.00 < 0.25	None
0.25 < 0.50	1 acre of wetlands
0.50 < 1.00	10 acres of wetlands
1.00 < 2.00	247 acres of wetlands
	1 occurrence of State-Concerned Species
2.00 < 3.00	523 acres of wetlands
	2 occurrences of State-Concerned Species
	1 occurrence of State-Endangered Species
3.00 < 4.00	667 acres of wetlands
	4 occurrences of State-Concerned Species

[20; 23]

SUMMARY

The Covitch Property/ATF Davidson Co. (FMR) property (the property) consists of approximately 65 acres of land on numerous parcels in Northbridge, Worcester County, Massachusetts at the following coordinates (measured from the center of the property): 42° 05' 34.5" north latitude and 71° 40' 34.0" west longitude. The property was originally developed in the late-1800s as a foundry and metal fabrication mill. The property is presently owned by the Whitinsville Redevelopment Trust (WRT) and the Arcade Realty Trust (ART) and is currently operated as leased manufacturing and commercial warehouse space to approximately 30 companies.

Parcels associated with the property are located on both the north and south side of the Mumford River, which bisects the property. The eastern extent of the property on the north side of the Mumford River is referred to by START personnel as the Covitch property, while the western extent of the property will be referred to as the Arcade property. The Covitch property consists of several large industrial mill buildings. The Arcade property is currently occupied by one building.

Major foundry processes at the Covitch property included metal casting, finishing, and heat treating. From approximately late 1800s to 1979, foundry wastes were mixed with foundry sand and deposited in an unlined landfill on the Arcade property. The landfilled material consists of 90% spent foundry sand, 5% coal ash, and 5% paint, plating sludge, plating rinsewater, bromide salt baths, solvents and cutting oils. The filled area has a surficial extent of approximately 730,000 square feet, containing approximately 40,000 cubic yards of material.

The Mumford River flows through the property in an easterly direction. The property is perched approximately 5 feet above the river. A man-made "Raceway" and a series of locks and gates, which were formerly utilized to divert water from the Mumford River in order to directly power the manufacturing equipment, runs beneath the property and several of the on-site buildings, although the locks and gates are currently closed isolating the Raceway from the river.

Untreated electroplating wastewater was discharged to the Mumford River from the property between 1930 to 1965. An on-site wastewater treatment plant was installed on the property in 1965 and treated wastewater was discharged to the Mumford River from 1965 until September 1982. Between 1974 and 1982 discharge of treated wastewater was carried out under a National Pollutant Discharge Elimination System (NPDES) permit (No. MA0001252). The wastewater treatment plant ceased operations in September 1982.

In 1985, as a result of an observation of oil in the surface water of the Raceway, separate hydrogeological investigations were conducted on the Covitch property and the Arcade property. The Covitch property investigation documented an area of oil contamination in the vicinity of Building No. 9, the Raceway, and the Mumford River. The area of oil contamination was a result of the temporary outdoor storage of oil-soaked metal turnings in the vicinity of Building No. 9 prior to their off-site disposal.

By 1996, a groundwater recovery system was installed in the area of contamination. During the construction of the recovery system, a cut-off trench was excavated and most of the oil

contamination was removed. The recovery system was operational from June 1986 to approximately 1987. The groundwater recovery system was shut-down due to decreased levels of volatile organic compounds (VOCs) in the influent samples.

The Arcade property investigation documented an area of volatile organic compound (VOC) contamination in the foundry waste landfill. Subsequent investigations of the VOC contamination found within the Arcade property foundry waste landfill concluded that the contamination was migrating towards the Mumford River. The contamination consisted predominantly of a parent compound (trichloroethene) and two "weathered" species (vinyl chloride and trans-1,2-dichloroethene).

Between 1985 and 1987, soil/source samples and groundwater samples were collected from the property and analyzed for VOCs, oil and grease, total phenols, barium, priority pollutant metals, and/or total cyanide during the hydrogeological investigations. Two VOCs, five inorganic elements, and oil and grease were detected in the soil/source samples above reference concentrations. Detected concentrations ranged from 0.6 to 12,000 parts per million (ppm). A total of nine VOCs and two inorganic elements were detected above reference concentrations in groundwater samples collected from the property. Detected concentrations range from 3 to 3,100 parts per billion (ppb).

Two rounds of sediment samples were also collected from the Mumford River between July and December 1985. The first round of sediment samples were analyzed for priority pollutant metals. Five metals were detected above reference values in the sediment samples. Detected concentrations ranged from 12 to 920 ppm. The second round of sediment samples were analyzed for chromium only. Chromium was detected from 200 to 2,300 ppm.

Between 1995 and 1996, approximately eight transformers which were known to contain polychlorinated biphenyls (PCBs) (approximately 3,000 gallons) were removed from the Covitch property. On 20 December 1996 CEH-Jacques Whitford (CEH-JW) collected three samples for PCB analysis from areas of obvious staining associated with transformers which had formerly been located on the Covitch property. PCBs were detected in one of the transformer samples at 400 ppm. CEH-JW also collected two shallow (0-2 feet below grade) soil samples from the ash disposal area on the property. Three inorganic elements were detected in one of the ash samples at concentrations ranging from 88 to 1,000 ppm.

Groundwater below the property generally flows towards the Mumford River in either a northerly or southerly direction, depending on the relative location of the river. The nearest municipal well is located approximately 0.9 miles northwest of the property in Northbridge, Massachusetts. The well is operated by the Whitinsville Water Company and serves approximately 2,814 people in the Town of Northbridge. There are approximately 19,466 people relying upon municipal drinking water wells located within 4-radial miles of the property.

Approximately 16 people utilize private wells within 0.25-radial miles of the property. There are approximately 4,879 people relying upon private groundwater wells for drinking water purposes within 4-radial miles of the property.

The most-upstream probable point of entry (PPE) area is along the western extent of the Arcade property. The downstream pathway includes flow along the Mumford River for approximately 4.5 miles until its convergence with the Blackstone River and flow for approximately 10.5 miles along the Blackstone River, until the 15-mile terminus is reached in Woonsocket, Rhode Island. The mean annual flowrate of the Mumford River is approximately 45 cubic feet per second (cfs) and the mean annual flowrate of the Blackstone River is 433 cfs. There are no known municipal drinking water intakes located along the downstream pathway. Both the Mumford River and the Blackstone River are recreational fisheries.

There are no sensitive environments located along the approximately 1.1 miles of Mumford River frontage which bisects the property. The nearest sensitive environment is an approximate 6-acre *Palustrine* forested wetland located approximately 0.8 miles downstream of the property. There are approximately 2.86 miles of wetland frontage along the Mumford River portion of the downstream pathway and approximately 5.44 miles of wetland frontage along the Blackstone River portion of the downstream pathway. There are two occurrences of State-listed species of concern along the Mumford River portion of the downstream pathway. There are two occurrences of State-listed threatened/endangered species and six occurrences of State-listed species of concern along the Blackstone River portion of the downstream pathway.

Both vehicular and pedestrian access to the portion of the property on the north side of the Mumford River is restricted. Three sides of the property are enclosed by a 6-foot high chain-link fence. There is also a combination of on-site employees and a 24-hour security service patrolling the property. However, pedestrian access to the property can be gained via the Mumford River. Additionally, there is unrestricted pedestrian and vehicular access to the former coal ash disposal area located along Douglas Road south of the Mumford River.

The nearest residence is located within the mill complex on the Covitch property. Four people reside in this residence: an employee of WRT, his wife, and their two children. The residence is located in Building No. 4. Alternatives Unlimited Day Habitation Program is a school located in one of the on-site buildings. The school is used to train special need students. The on-site resident as well as the students and faculty of the school are not likely targets for soil exposure due to the fact that activities are limited to within the on-site buildings and the buildings are not believed to be located on a source. Approximately 5,327 people reside within 1-radial mile of the property.

There are approximately 1,200 people employed with and working for the businesses located on the property. The on-site employees are not likely targets for the air exposure pathway because activities are limited to within the on-site buildings and the buildings are not believed to be located on a source. There is one occurrence of State-threatened/endangered species and seven occurrences of State-listed species of concern located within 4-radial miles of the property. There are approximately 1,448 acres of wetlands within 4-radial miles of the property.

**COVITCH PROPERTY/ATF DAVIDSON CO. (FMR)
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